



A Study on Google Searches in Banking

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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ABSTRACT

This paper examines the determinants of Google search in the banking area. The weekly Google data from 2004 to 2013 used for this study consists of the 30 largest banks, the Federal Reserve, and the European Central Bank. To my knowledge, this is the first study on the determinants of Google data. Firstly the paper shows that Google searches are correlated with several performance variables and market data, such as asset prices and trading volume. Secondly it demonstrates that banks' internal performance data has a major influence whereas market data is rather insignificant. Moreover it is shown that Google search for central banks is largely determined by the level of interest rates as well as the inflation and output gap. This is evidence that central bank attention is primarily driven by the policy targets. Accordingly Google data can be applied to analyze the timely impact of monetary policy.

Keywords: Google data; commercial banks; central banks; JEL classification: G12; E65; C58.

1. INTRODUCTION

Economists have been studying the determinants of asset prices and the importance of investors' attention for many years (Allen [1]; Da, Engelberg and Gao [2]). This literature assumes

that economic agents gather the relevant information, which is then used as a basis of the investment decision. However empirical and theoretical studies by Cohen [3] and Duffie [4] emphasize that information processing can be complex and lengthy in reality. Hence, a better

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understanding of decision-making requires a profound knowledge of investors' attention and, even more importantly, the determinants of attention.

Until today, there has been almost no direct data available for the measurement of investors' attention. However, in a recent paper Da, Engelberg and Gao [2] suggest a direct measure for attention: Google searches. This complements the existing literature which applies proxies such as trading volume (Brailsford [5]), news, and stock returns (Barber [6]). Taking Google searches as a proxy of attention is an interesting idea. But this does not answer the fundamental question: What drives attention measured by Google in the first place? This paper sheds light on this issue.

There is no doubt that Google will gain even further importance in the future because of the increasing share of markets that operate completely electronically. The usage of high-frequency trading is a good example in finance today. These trading machines are based on search algorithms including statistical data and data from search engines. The flash crash on May 6th 2010 illustrates this issue. At this time, the Dow Jones Industrial Average plunged by seven hundred points and rebounded within just a few minutes due to errors in the data process together with the electronic algorithms.

The new research agenda proposed in this paper is also a continuation of an existing research field, however, with the usage of new data such as Google. The existing research was awarded with the Nobel Prize in economics in 2013. The three Nobel laureates E. Fama, R. Shiller, and P. Hansen [7] worked on this topic for more than three decades. Moreover, a few years ago Choi and Varian [8] argued as well that search data has the potential for forecasting a variety of important economic and financial trends.

The main contributions in this paper are as follows: Firstly there is a correlation between Google data and financial data. The empirical results elucidate the drivers of Google searches and demonstrate the application of Google in decision-making processes. The theoretical underpinning is the Romer and Romer [9] approach which is used in the empirical literature. Secondly there is evidence that search data identifies new trends and the effectiveness of new policy instruments. For instance, there is a strong correlation of Google searches with

several performance variables. Moreover, the paper shows that bank-related performance data has a major influence on Google, whereas market data is rather insignificant. Interestingly the variables in the econometric model explain almost 90 percent of the variance, although some results are spurious.

Google search for the Federal Reserve System (FED) or the European Central Bank (ECB) is largely driven by variables such as the interest rate level and both the inflation and output target. On the contrary, variables such as market developments have almost no impact. This gives evidence that central bank attention is driven by its primary mandate, not by financial developments. In addition, Google can be used as a valuable 'news' measure for the respective institution in general. The internal data almost entirely determines the agents' attention over time. Furthermore, the paper provides first evidence that unconventional monetary policies, such as 'forward guidance', are less efficient than perceived.

The remainder of the paper is structured as follows: description of the data in section 2, discussion on the empirical results in section 3, and finally conclusion in section 4.

2. DATA GENERATING PROCESS

Obviously, in this study, the main source of data is Google. The data is freely accessible on <http://www.google.de/trends/>. Of course, Google.com is just one search engine of many, however, it has been predominant in the market of search engines for years. It is important to recognize that the search data is not an absolute measure of search traffic and that it is scaled in the range between 0 and 100. The peak in the time series of Google search gets the value of 100, and the other search values are numbered correspondingly. Furthermore it is important to know that the earliest search data available starts in January 2004. Google.com provides data in a weekly frequency for almost all search expressions. In some cases, however, the earliest search data is available at a later point of time and only in a monthly frequency.

The sample consists of 30 SIFIs that are among the world's 50 biggest banks according to a ranking in 2012 (Global Finance 2012). The limitation of the sample is due to constraints on the data availability (Table 1). Nevertheless the sample consists of 30 banks across 13 countries,

which is sufficient to be representative. These banks also cover a considerable market share and more importantly, these 30 SIFIs have sufficient search traffic which is required for a reliable time series analysis. The Google data is searched in full names, e.g. 'Deutsche Bank' as seen on Table 1. For each bank, I also gather comparable accounting variables in a quarterly or monthly frequency. Table 2 groups these accounting or performance measures in four categories, namely valuation, profitability, efficiency, and capital measures.

Except for stock price and volume, the performance related data is only available on a quarterly basis. Thus it is necessary to convert all quarterly time series into a weekly time-series. For this conversion, I use the Financial Toolbox in MATLAB which provides an appropriate algorithm.

3. STATISTICAL ANALYSIS AND DISCUSSION OF RESULTS

This section analyzes the determinants of Google search. In the first step, I look at the correlation between Google searches and the respective performance measures, concomitantly addressing the question: How does agents' attention affect and correlate with Google search? Even though this alone is an interesting research question, the paper goes beyond this topic. Brailsford [5] identified a relationship between attention measures and trading volume. This paper addresses a similar and yet further question: What are the drivers of this relationship? Thereafter the correlation is used to study the leading or lagging properties of Google. In the second step, I focus on specific features, such as how public policy potentially affects the time series of Google search. This question is of great importance in the wake of the financial crisis. It can be applied to study the prompt effectiveness of new policy instruments. For instance, almost all central banks used new instruments for the provision of liquidity to calm the financial turmoil (Fleming [10]). Thus, the paper studies how the banking sector's volatility affects the time-series variation of Google. In light of these issues, the paper contributes to a growing literature about Google, however, with a novel direction in this field.

Let me start with correlation numbers (Table 3). Right from the beginning, there are a few interesting points to note. In Table 3, both the first and second columns are not per se valuation

measures. They depict stock price and stock volume. The correlation between volume and Google is almost always positive with a mean of 0.2 and a variance of 0.06. However the correlation between stock price and Google seems to be negative with a mean of -0.15 and a variance of 0.19. But here, the results are more ambiguous. Overall, trading volume seems to be correlated with Google, which is not surprising because trading volume is already used as a proxy of attention in finance literature. Thus the positive correlation confirms that Google is a reasonable measure of agents' attention. Or put it differently, Google search of SIFIs is positively driven by the trading volume of the respective institution. The conventional valuation measures in Table 3 are from the fourth to the ninth column. Interestingly the mean correlation of Google with all valuation measures is almost always negative, except for the dividend payout ratio. It turns out that in the majority of cases, high Google searches imply low valuations.

Table 2A (appendix) displays the correlation coefficients of Google with standard profitability measures of the respective 30 SIFIs. Again, behind each number is a weekly time-series from 2004 to 2013. There is weak evidence, again, that Google is negatively correlated with profitability measures. However it is not as conclusive as it is for the valuation measures. Most convincing are the different return measures whose mean correlations are always negative and the variances are minute. Consequently Google searches on the respective financial institutions are high if the return measures are low. The return on assets in percent is the most obvious example. Table 3A and 4A (appendix) summarize the correlation of Google with the efficiency and liquidity measures as well as the measures for the capital structure.

Next time-series correlations are analyzed, differentiating the four quarters in the past from those in the future. The computation of time-series correlations demonstrates that Google clearly has a positive relationship for all four quarters in average (Table 5A). The greater the time gap, the lower the positive correlation. Only two out of the thirty banks display negative correlation numbers. However more important is the coincidence of quarterly cross-correlations of Google with both stock price and trading volume. By looking at these time-series correlations, it can be identified whether Google is a leading or lagging variable (Table 4, Table 5).

Table 4 illustrates the quarterly time-correlations of Google with respect to the stock price. In theory, the value of stocks is equal to the present-value of future dividends. Due to this fact, the current stock price represents future expectations. Not surprisingly, Google, which is a measure of instantaneous attention, is always lagging behind this idea of stock price valuation, which represents future returns. This pattern is indicated by the negative correlation and in line with the evidence from Table 1. In addition, the negative correlations become greater as the time window moves to the future. Likewise, as the time window moves backwards, the negative correlations become smaller and eventually positive. It is noteworthy that there are smaller negative correlations between 0Q and -4Q. This implies that Google attention is lagging behind the future characteristics of stock price valuation.

The quarterly time-series correlations of trading volume with Google represent another picture (Table 5). First of all, trading volume measures current turnover of stocks. Thus it is, by definition, a similar measure of instantaneous attention. Indeed, in average, all correlations are positive, and the highest correlation is between Google and trading volume at the same time period. This demonstrates that Google and trading volume are coincident variables. Moreover a detailed analysis and comparison of the correlations indicate that they are higher in the future periods and lower in the past periods (Table 5). The strong correlations between 0Q and +4Q imply that Google tends to lead trading volume. This demonstrates that the speed of transmission, i.e. Google news, is faster than the transmission of stock trades. In summary, the quarterly time series confirm that Google search has valuable information in predicting future trends.

Table 1. Sample of Systemically Important Financial Institutions (SIFIs)

Ranking	Bank	Country	Total Assets in \$ per million
1	Deutsche Bank	Germany	2,799,977
2	HSBC	UK	2,555,579
3	BNP Paribas	France	2,542,738
4	Industrial a. Commercial Bank of China	China	2,456,287
5	Mitsubishi UFJ Financial Group	Japan	2,447,950
6	Crédit Agricole	France	2,431,796
9	JP morgan chase	United States	2,265,792
10	Bank of America	United States	2,129,046
11	China Construction Bank	China	1,949,213
12	Mizuho Financial Group, Inc.	Japan	1,890,219
13	Bank of China	China	1,877,514
17	Banco Santander	Spain	1,619,259
18	Sumitomo Mitsui Financial Group	Japan	1,598,424
19	Société Générale	France	1,528,492
20	UBS	Switzerland	1,508,302
23	Wells Fargo	United States	1,313,867
24	UniCredit	Italy	1,199,079
26	China Development Bank	China	992,158
28	Goldman Sachs	United States	942,140
29	Nordea	Sweden	926,645
30	Norinchukin Bank	Japan	908,793
31	Commerzbank AG	Germany	856,208
33	Royal Bank of Canada	Canada	797,262
34	Banco Bilbao Vizcaya Argentaria	Spain	773,305
36	The Tronoto Bank	Canada	735,947
37	Bank of Communications	China	731,826
42	Bank of Nova Scotia	Canada	596,990
43	Danske Bank	Denmark	596,004
47	Banco do Brasil S.A.	Brazil	523,295

Table 2. Four categories of performance measures

Measures of...			
Valuation	Profitability	Efficiency & Liquidity	Capital Structure
Stock price	Non-interest income margin (%)	Efficiency ratio (%)	Financial leverage
Stock volume	Non-interest expense margin (%)	Total asset turnover	Deposits/assets (%)
Price/earnings	Cash flow return on invested capital (%)	Tier 1 capital adequacy ratio (%)	LT debt/equity
Price/cash flow	Pretax margin (%)	Risk weighted assets	LT debt/total capital (%)
Price/book value	Net margin (%)	Total capital adequacy ratio (%)	Total debt/total assets (%)
Price/tangible book value	Return on assets (%)	Loans/deposits (%)	Net debt/total equity (%)
DPS	Return on RWA (%)		Total debt/total equity (%)
Dividend payout ratio (%)	Return on equity (%)		Total debt/total capital (%)
	Return on total capital (%)		
	Return on invested capital (%)		
	Loan loss provision margin (%)		
	Basic DuPont ROE (%) (3 Step)		
	Net margin (%)		
	Asset turnover		
	Equity multiplier		

Table 3. Correlation with valuation measures

Google	Stock Price	Stock Volume	Price/Earnings	Price/Cash Flow	Price/Book Value	Price/Tangible Book Value	DPS	Dividend Payout Ratio (%)
Banco Bilbao V. Argentaria	0.03	0.08	-0.30		-0.17	-0.16	0.18	-0.22
Banco do Brasil	0.63	0.64	-0.45	-0.65	-0.53	-0.48	0.67	-0.05
Banco Santander	-0.46	0.24	-0.40	-0.78	-0.77	-0.71	0.63	0.22
Bank of China	-0.03	0.18	0.45	0.13	0.34	0.32	-0.44	-0.24
Bank of Communications	-0.14	0.27	-0.45	-0.41	-0.06	-0.07	0.23	-0.12
BNP Paribas	-0.15	0.26	-0.24		-0.59	-0.52	-0.19	-0.19
Bank of America	-0.75	0.60	-0.02	-0.17	-0.85	-0.60	-0.57	0.53
China Construction Bank	0.33	0.09	0.53	-0.12	0.53	0.51	-0.56	0.32
China Development Financial Group	-0.46	0.00	-0.16	-0.37	-0.32	-0.32	0.38	0.41
Commerzbank	-0.62	0.70	0.27	-0.06	-0.69	-0.69	-0.38	0.29
CréditAgricole	-0.66	0.45	-0.05		-0.87	-0.93	-0.28	0.31
Danske Bank	-0.66	0.00	0.32	0.55	-0.82	-0.78	-0.79	-0.75
Deutsche Bank	-0.26	0.40	-0.23	-0.18	-0.26	-0.25	-0.12	-0.05
Goldman Sachs	0.48	0.27	-0.03	0.00	0.22	0.18	0.08	-0.16
HSBC								
Industrial Commercial Bank of China	0.08	-0.09	0.04	-0.09	-0.09	-0.08	0.06	-0.09
JP Morgan Chase			0.31	0.09	0.19	0.24	0.01	0.30
Mitsubishi Financial Group	-0.41	0.33	-0.24	-0.30	-0.46	-0.46	0.15	0.33
Mizuho Financial Group	0.37	0.02	0.26	-0.25	0.00	-0.01	0.05	0.23
Nordea	0.35	0.02	-0.12	-0.29	-0.42	-0.43	0.27	0.02
Norinchukin Bank	-0.40	-0.02	-0.16	-0.57	0.00		-0.17	-0.19
Royal Bank of Canada	-0.64	-0.04	-0.20	0.47	0.45	0.42	-0.86	-0.51
SociétéGénérale	-0.38	0.33	0.33		-0.30	-0.27	-0.28	0.16
Sumitomo Mitsui Financial Group	0.20	-0.02	0.01	0.38	-0.21	-0.21	0.29	-0.07
The Bank of Nova Scotia	0.22	0.21	-0.22	-0.43	-0.36	-0.20	0.61	0.47
The Toronto Bank	-0.73	-0.14	0.38	0.12	0.56	0.56	-0.87	-0.16
UBS	0.52	0.01	-0.06	-0.08	0.45	0.49	0.23	0.29
UniCredit	-0.65	0.56	-0.14		-0.81	-0.67	-0.73	-0.44
Wells Fargo	0.10	0.10	-0.32	0.04	-0.67	-0.64	-0.31	-0.24
Mean	-0.15	0.20	-0.03	-0.13	-0.23	-0.21	-0.10	0.01
Median	-0.15	0.18	-0.09	-0.12	-0.28	-0.25	-0.05	-0.05
Varinace	0.19	0.06	0.08	0.11	0.20	0.19	0.20	0.10

Table 4. Quarterly cross-correlations (time series), 2004 to 2013

Google to Stock Price	-4Q	-3Q	-2Q	-1Q	0Q	+1Q	+2Q	+3Q	+4Q
Banco Bilbao V. Argentaria	0.20	0.15	0.14	0.12	0.03	-0.01	-0.07	-0.15	-0.19
Banco do Barsil	0.66	0.66	0.63	0.63	0.63	0.60	0.55	0.48	0.40
Banco Santander	-0.21	-0.28	-0.39	-0.46	-0.46	-0.46	-0.46	-0.51	0.34
Bank of China	0.37	0.11	0.05	0.07	-0.03	-0.15	-0.11	-0.09	-0.16
Bank of Communications	-0.01	-0.06	-0.10	-0.12	-0.14	-0.31	-0.03	0.18	0.11
BNP Paribas	0.01	-0.02	-0.04	-0.11	-0.15	-0.26	-0.40	-0.59	-0.70
Bank of America	-0.56	-0.62	-0.67	-0.72	-0.75	-0.80	-0.83	-0.84	-0.84
China Construction Bank	0.33	0.41	0.45	0.39	0.33	0.21	0.10	0.17	0.26
China Development Financial Group	-0.24	-0.28	-0.23	-0.28	-0.46	-0.50	-0.48	-0.41	-0.49
Citi Group	0.67	0.65	0.64	0.61	0.57	0.55	0.53	0.50	0.45
Commerzbank	-0.35	-0.40	-0.48	-0.55	-0.62	-0.67	-0.71	-0.73	-0.75
CréditAgricole	-0.43	-0.50	-0.57	-0.61	-0.66	-0.69	-0.73	-0.76	-0.80
Danske Bank	-0.46	-0.55	-0.61	-0.65	-0.66	-0.71	-0.73	-0.73	-0.71
Deutsche Bank	0.16	0.04	-0.05	-0.15	-0.26	-0.32	-0.38	-0.46	-0.56
Goldman Sachs	0.15	0.27	0.34	0.44	0.48	0.43	0.42	0.40	0.38
HSBC									
Industrial Commercial Bank of China	0.19	-0.16	-0.13	0.09	-0.05	-0.24	-0.15	0.11	0.31
JP Morgan Chase									
Mitsubishi Financial Group	-0.27	-0.29	-0.30	-0.36	-0.41	-0.49	-0.49	-0.48	-0.48
Mizuho Financial Group	0.63	0.58	0.54	0.46	0.37	0.26	0.12	-0.01	-0.10
Nordea	0.48	0.44	0.45	0.39	0.35	0.25	0.15	-0.03	-0.20
Norinchukin Bank	-0.37	-0.38	-0.46	-0.46	-0.40	-0.34	-0.27	-0.20	-0.14
Royal Bank of Canada	-0.61	-0.62	-0.62	-0.63	-0.64	-0.60	-0.54	-0.55	-0.55
SociétéGénérale	-0.09	-0.17	-0.26	-0.32	-0.38	0.45	-0.52	-0.61	-0.70
Sumitomo Mitsui Financial Group	0.49	0.43	0.34	0.25	0.20	0.12	0.05	0.01	-0.03
The Bank of Nova Scotia	0.34	0.34	0.31	0.28	0.22	0.18	0.10	0.04	0.02
The Toronto Bank	-0.64	-0.65	-0.69	-0.72	-0.73	-0.70	-0.65	-0.60	-0.55
UBS	0.79	0.74	0.68	0.58	0.52	0.45	0.68	0.74	0.23
UniCredit	-0.37	-0.44	-0.51	-0.58	-0.65	-0.72	-0.77	-0.82	-0.85
Wells Frago	-0.17	-0.11	-0.03	0.02	0.10	0.11	0.12	0.13	0.15
Mean	0.02	-0.02	-0.06	-0.09	-0.13	-0.19	-0.20	-0.21	-0.22
Median	0.00	-0.08	-0.08	-0.12	-0.15	-0.28	-0.21	-0.18	-0.18
Varinace	0.18	0.19	0.20	0.20	0.20	0.19	0.19	0.20	0.19

Source: own

Table 5. Quarterly cross-correlations (time series), 2004 to 2013

Google to Stock Price	-4Q	-3Q	-2Q	-1Q	0Q	+1Q	+2Q	+3Q	+4Q
Banco Bilbao V. Argentaria	0.01	0.04	0.05	0.09	0.08	0.08	0.07	0.10	0.10
Banco do Barsil	0.63	0.57	0.63	0.60	0.64	0.64	0.66	0.63	0.58
Banco Santander	0.28	0.31	0.30	0.28	0.24	0.20	0.19	0.14	0.07
Bank of China	0.09	0.01	0.09	0.08	0.18	0.29	0.22	0.11	0.17
Bank of Communications	0.04	-0.01	0.00	0.14	0.27	0.18	-0.23	-0.10	0.03
BNP Paribas	0.10	0.23	0.25	0.24	0.26	0.29	0.38	0.37	0.34
Bank of America	0.41	0.47	0.51	0.55	0.60	0.60	0.61	0.60	0.52
China Construction Bank	0.15	0.11	0.05	0.08	0.09	-0.01	-0.03	-0.08	0.01
China Development Financial Group	-0.08	-0.10	0.00	-0.02	-0.01	0.08	0.10	0.12	-0.01
Citi Group	-0.51	-0.49	-0.47	-0.45	-0.26	-0.29	-0.32	-0.19	-0.27
Commerzbank	0.35	0.41	0.51	0.59	0.70	0.66	0.68	0.63	0.57
CréditAgricole	0.39	0.45	0.50	0.49	0.45	0.44	0.45	0.46	0.45
Danske Bank	0.07	0.06	0.00	0.02	0.00	-0.02	-0.09	-0.14	-0.13
Deutsche Bank	0.09	0.24	0.24	0.28	0.40	0.27	0.29	0.28	0.29
Goldman Sachs	-0.06	-0.01	0.08	0.11	0.27	0.21	0.26	0.24	0.26
HSBC									
Industrial Commercial Bank of China	-0.17	0.19	0.06	0.05	0.08	0.03	0.04	-0.01	-0.03
JP Morgan Chase									
Mitsubishi Financial Group	0.21	0.27	0.28	0.24	0.33	0.22	0.24	0.15	0.22
Mizuho Financial Group	-0.23	-0.20	-0.03	0.01	0.02	0.08	0.05	0.09	0.09
Nordea	0.01	0.02	0.02	-0.06	0.02	-0.04	-0.03	-0.05	-0.07
Norinchukin Bank	-0.17	-0.09	-0.11	-0.05	-0.02	0.02	-0.05	-0.08	-0.05
Royal Bank of Canada	-0.18	-0.15	-0.11	-0.07	-0.04	-0.09	-0.07	-0.01	-0.02
SociétéGénérale	0.27	0.28	0.25	0.28	0.33	0.31	0.33	0.40	0.40
Sumitomo Mitsui Financial Group	-0.31	-0.29	-0.22	-0.12	-0.02	0.03	0.11	0.22	0.35
The Bank of Nova Scotia	0.12	0.17	0.17	0.20	0.21	0.19	0.19	0.19	0.15
The Toronto Bank	-0.23	-0.21	-0.18	-0.19	-0.14	-0.18	-0.13	-0.12	-0.17
UBS	0.01	0.02	0.00	0.00	0.01	0.12	0.00	0.02	0.17
UniCredit	0.49	0.48	0.52	0.51	0.56	0.58	0.60	0.59	0.63
Wells Frago	0.06	0.07	0.07	0.09	0.10	0.10	0.09	0.06	0.04
Mean	0.07	0.10	0.12	0.14	0.19	0.18	0.16	0.16	0.17
Median	0.07	0.06	0.07	0.09	0.14	0.15	0.10	0.11	0.12
Varinace	0.07	0.07	0.06	0.06	0.06	0.06	0.07	0.06	0.06

Source: own

In the following, the relationship between Google and the other drivers, such as news variables, is discussed. This question is in line with the research by Tetlock [11], who studied the impact of news media. I apply this idea and analyze the effect of news coverage in accordance with Google. Although this study limits the attention to the banking sector from 2004 to 2013, it provides interesting insights. Table 6, on the left-hand side, shows the correlations of Google search for the ECB and the 'ECB Rate' with their related economic and news variables: a) the key central bank interest rate in percent and b) the interest rate dummy, indicating one if there is any change and zero otherwise. Interestingly, all correlations are positive. High Google searches for the ECB are driven by both the dates of interest rate changes and the level of the interest rate. The last finding indicates that the search for 'ECB' is higher or becomes higher when there is an increase in the interest rate, which is illustrated by a correlation of 0.31. This is somewhat surprising because it reveals a symmetric attention effect in monetary policy in Europe. The finding of this attention effect is the opposite for the FED. Moreover Google and the 'ECB Rate' are, again, positively correlated with both the level of interest rates and the ECB rate dummy. There is more Google search for the expression of 'ECB Rate' at times of interest rate changes, indicated by the correlation of 0.44.

On the right-hand side of Table 6, correlation numbers for the Federal Reserve (FED) in the US are indicated. The result is similar with the exception of Google search for 'FED' and the level of the federal funds rate. Interestingly, here, the correlation is negative which illustrates an asymmetric attention effect. For a while, this has been an unsolved conundrum. It is still unclear whether such an asymmetric effect exists. My finding provides some evidence on this asymmetric attention effect, but only in the US.

It turns out that Google data is also a good measure of news (Table 1A). For instance,

studying the recent financial changes in both the intuitional and regulatory set-up in Europe gives evidence for this finding, i.e. the European Financial Stability Facility (EFSF), the European Stability Mechanism (ESM), and Basel III. Since the main diagonal of Table 1A is always positive, I confirm that Google is equal to a news measure. There is a similar finding for other search expressions in Table 1B. The results show that high attention for ECB is correlated with the attention on the ECB Rate ($\rho=0.36$), the debate on bank bailouts ($\rho=0.43$), the rescue facilities EFSF/ESM ($\rho=0.27/\rho=0.16$), etc. Overall, the results demonstrate a positive correlation between the variable and the news dummy, hence Google is a reliable measure of news.

Finally the impact of Google as a measure of attention is studied using an econometric model (Romer and Romer [9]). The main objective is the identification of the drivers of Google and its significance as a news variable. The standard specification of how attention affects the changes of Google search is formulated as

$$\Delta Google_t = \alpha + \beta \Delta News_t + \varepsilon_t \quad (1)$$

where ε_t represents the standard error term. Presumably the news variable has an impact on all periods, however, I disregard this factor for simplicity. Moreover, besides specific news, there is no doubt that a variety of factors affect Google searches, e.g. the overall economic environment, the national and international policy, and any kind of event. But all of these events are measured by the prospective component of ε_t . Consequently ε_t , as modeled in equation (1), is composed of a variety of M factors: $\varepsilon_t = \sum_{i=1}^M \varepsilon_t^i$. Obviously, the M factors, ε_t^i , are not correlated with each other. Therefore external and internal factors are differentiated:

$$\Delta News_t = \sum_{i=1}^M \gamma_t^i \varepsilon_t^i + \sum_{j=1}^N \theta_t^j \quad (2)$$

Table 6. Correlations numbers

ECB			FED		
	Google Searches for...			Google Search for...	
	ECB	ECB Rate		FED	FED Rate
Central Bank Interest Rate in per cent	0.31	0.26	FED Funds Rate in per cent	-0.36	0.35
ECB Rate Dummy ¹⁾	0.37	0.44	FED Rate Dummy ¹⁾	0.14	0.21
1) Dummy variable is 1 if ECB has changed the interest rate and is equal to 0 if ECB kept the rate unchanged.			1) Dummy variable is 1 if FED has changed the interest rate and is equal to 0 if FED kept the rate unchanged.		

Source: own calculations

where $\gamma_t^i \varepsilon_t^i$ are internal measures and θ_t^j are the external. Here, internal variables are defined as first-order variables and the external are second-order variables. In terms of central banks, the internal variables are the targets in the loss function, e.g. the output target, inflation target, and interest rate. External factors are regulations or financial market developments. The internal factors are modeled in a way that each event has a discrete impact on news in period t . Substituting equation (2) into (1) yields

$$\Delta Google_t = \alpha + \beta \left[\sum_{i=1}^M \gamma_t^i \varepsilon_t^i + \sum_{j=1}^N \theta_t^j \right] + \varepsilon_t. \quad (3)$$

A general model includes a lag-structure of Google search and dummy variables with interaction terms. The data collected for the econometric study is from the period between 2008 and 2013 because several time series have no valid search data before this period, even though Google reports data from 2004 onwards. The general specification is

$$\Delta Google_t = \alpha + \beta \sum_{j=1}^N \theta_t^j + \left[\sum_{z=1}^K \delta_z \Delta Google_{t-z} \right] + \nu_t. \quad (4)$$

Where $\nu_t = \sum_{i=1}^M (1 + \beta \gamma_t^i) \varepsilon_t^i$. Time-lags of four weeks are expressed as $h = 1, 2, 3$ and 4 . Given that there is a direct measure for all $\gamma_t^i \varepsilon_t^i$ and θ_t^j , they are not correlated with the error term ν_t . Thus equation (4) obtains an unbiased estimate of the impact of external news events on Google search. One can also interpret the $\sum_{j=1}^N \theta_t^j$ as a measure of random shocks in terms of changes in news.

Firstly I estimate equation (3) and (4) for the ECB and the FED (Table 7). Both regressions study the time-series drivers of Google and differentiate between internal and external drivers. For this regression model, the internal variables are given by the Taylor-function, such as the inflation and output target. Moreover the regression considers the level of the key interest rate as an internal variable. The external variables are the News Dummy on central bank decisions, financial regulation, and stock market developments. The overall result is similar for both central banks. Google search is significantly determined by internal variables, which directly affect the internal decision-making process of a central bank. The external variables, such as central bank news or regulatory news, are also significant. Overall, Google data is mainly driven by the respective news dummy (Table 7). Interestingly the reaction function measured with

Google is slightly different between the ECB and the FED. A positive output and inflation gap reduce Google search for the ECB and increase that of the FED. This pattern can be explained by the fact that the ECB has a two-pillar strategy but primarily focuses on inflation according to article 105 EU-Treaty. On the contrary, the FED has a dual mandate, and thus new information on both targets increase the Google attention. As expected, the News Dummy for the ECB and the FED is significant and has a positive sign. Surprisingly the result shows that stock market developments do not influence the attention of central banks, even if they are responsible for both financial and macroeconomic instability in the US and Europe. Consequently Google reacts little to the external variables. As expected, the internal variables are the major drivers of Google.

Furthermore these results shed light on the importance of Google as a new monetary policy variable. A recent paper by Mc Andrews [12] finds that announcements about the Term Auction Facility (TAF) significantly lowered credit spreads. I find that the announcements about TAF produce a significant search peak in Google for the FED. Thus the attention and the later effectiveness of new instruments can be approximated via Google, too. In fact, the more people search, the more appealing or interesting the new (Google) measure might be. This could give an indication on the effectiveness of new or unconventional monetary instruments. The effectiveness of TAF is verified in several studies, such as (Christensen [13], Sarkar and Shrader [14], Wu [15]). Interestingly all other recent programs do not show any peculiar pattern in Google.

Miskin [16] suggests, in a survey paper on the evaluation of the effectiveness of unconventional monetary measures, that there is a need of more instantaneous measures. I suggest Google is able to close the current evaluation gap. For instance, in March 2008, the FED added so-called forward guidance to its policy, stating that it would maintain the interest rates 'exceptionally low for an extended period'. However the effectiveness of forward guidance has not been proven until now. Using Google data can potentially enlighten on this issue.

Since December 2008, the FED's target for the federal funds rate has been between zero and 0.25 percent. But when the economy required further policy stimulus, the FED used 'forward guidance'. In December 2012, for the first time,

the FED announced that it will keep the federal funds rate at low levels under the following conditions: a) the unemployment rate remains above 6.5 percent, b) inflation does not increase greater than 0.5 percentage points above the Committee's 2.0 percent goal, c) long-term inflation expectations continue to be well-anchored. This information should guide future households, businesses, and investors' decisions. Fig. 1 displays Google search of the FED. The grey areas highlight the periods under consideration. The TAF program was announced in December 2007 and implemented in January, February, and March 2008. Here, there is a measureable increase in the FED's attention.

Interestingly forward guidance announced in December 2012 received less attention. Even more importantly, the pattern in that time is similar to that of previous years. At the first

view, it appears to be a normal cyclical pattern, independent of the announcement of 'forward guidance'. If there is a connection between attention and effectiveness, as it is proven in the case of TAF, the Google pattern reveals also something about the (in) effectiveness of 'forward guidance' in monetary policy. There is definitely room for further research on this idea.

At the end, Model I (eq. 3) and Model II (eq. 4) for the 30 commercial banks are estimated. Table 6A and Table 7A summarize the econometric estimations. The main Google drivers of all commercial banks are the internal variables, such as the performance measures. The stock price and trading volume are treated as external variables. In almost all cases, the financial market is significant, however the sign is alternating.

Table 7. Regression result for google and ECB vs. FED

Variable	ECB		Variables	FED	
	Model 1 (Eq. 3)	Model 2 (Eq. 4)		Model 1 (Eq. 3)	Model 2 (Eq. 4)
Constant	19.51811*** (0.2836)	11.80198*** (0.4437)	Constant	40.85754*** (0.6532)	30.10673*** (1.1109)
Inflation Gap	-0.170019*** (0.0240)	-0.071353*** (0.0189)	Inflation Gap	0.09661*** (0.1180)	0.07438*** (0.0107)
Output Gap	-0.010933 (0.0145)	-0.02783*** (0.0109)	Output Gap	0.023562*** (0.0050)	0.024224*** (5.4092)
ECB Rate	0.522383*** (0.0065)	0.360502*** (0.0099)	FED Rate	0.032526*** (0.0018)	0.028771*** (0.0017)
ECB-NEWS Dummy	3.096184*** (0.3816)	3.423101*** (0.2966)	FED-NEWS Dummy	4.872023*** (0.4795)	4.278101*** (0.4344)
BIS-NEWS Dummy	-1.162023*** (0.3814)	-0.733233*** (0.2897)	BIS-NEWS Dummy	-0.45053 (0.5458)	-0.725593 (0.4872)
DAX_D	0.477156 (0.5550)	0.181526 (0.4167)	DOW_D	0.622342 (0.4787)	0.678097 (0.4251)
CAC_D	0.720246 (0.6297)	0.402362 (0.4726)	SEC_D	0.856692 (0.6058)	1.346698** (0.5437)
FTSE_D	-0.232625 (0.5133)	-0.107742 (0.3877)	FED_GO(-1)	-	0.179629*** (0.0229)
IBEX_D	-0.625333 (0.4575)	0.0765 (0.3445)	FED_GO(-2)	-	0.032737 (0.0241)
ECB_GO(-1)	-	0.133858*** (0.0216)	FED_GO(-3)	-	-0.007745 (0.0243)
ECB_GO(-2)	-	0.068441*** (0.0224)	FED_GO(-4)	-	0.038177* (0.0208)
ECB_GO(-3)	-	0.070462*** (0.0216)			
ECB_GO(-4)	-	0.081486*** (0.0205)			
R-squared	0.934979	0.957776		0.871106	0.900579
Adjusted R-squared	0.933785	0.956637		0.869272	0.89832
S.E. of regression	3.601391	2.691941		5.177478	4.583175
F-statistic	782.8902	841.0264		475.0128	398.5629
Prob(F-statistic)	0	0		0	0
Durbin-Watson stat	0.58294	0.847751		0.821135	1.129965

Dependent variable: Google search of 'ECB'. Number in brackets are Std. Error. Significance of the coefficients (T-values) are indicated by stars: *** = 1%, ** = 5% and * = 10%

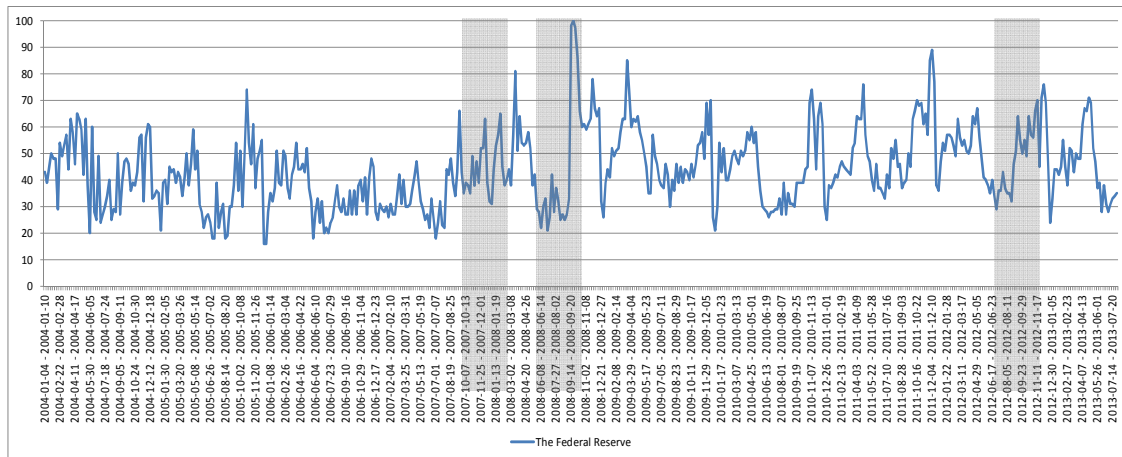


Fig. 1. Google search of 'the federal reserve'

Obviously, the study has certain limitations. Firstly, the study excludes some macroeconomic variables that may affect the searches. Secondly, there is a potential selection bias. However this is a common problem in empirical studies. Sometimes the exclusion of data is needed to reduce multi-collinearity, even if this creates a possible omitted-variable bias. Therefore the empirical approach makes sure to take this into account and calculate standard errors adjusted to autocorrelation and heterogeneity. Nonetheless, the findings can be cautiously generalized. Moreover, a further research question could be whether Google has an informative character for the expected default of commercial banks. Collecting banks' likelihood of default and their return and accounting fundamentals may provide another interesting application of Google in the future.

4. CONCLUSION

This paper makes several contributions to the new field of electronic search data. The study analyzes the drivers of Google for large international banks and central banks and differentiates internal and external factors. There is evidence that both variables have an impact on Google, however, internal variables show more significant impacts. Moreover it turns out that Google data is a valuable measure of news. The evaluation of correlations gives evidence of certain leading and lagging properties. To my knowledge, this paper is the first that studies the determinants of Google search. Therefore the paper offers a novel contribution to the finance literature.

To sum up, Google is a useful data source. It is obvious that more research needs to be done on the predictive power of Google. Although this paper provides preliminary evidence, there is room for further research. I suggest an extension of the model with macroeconomic fundamentals, analyst forecasts, and other sectors. A rigorous evaluation of the forecasting and nowcasting power would be another interesting field. Consequently this paper has a potential to initiate empirical research on a new and lively topic.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Allen F. The market for information and the origin of financial intermediation. *Journal of Financial Intermediation*. 1990;1(1):3-30.
2. Da Z, Engelberg J, Gao P. In search of attention. *Journal of Finance*. 2011; 66(5):1461-1499.
3. Cohen L, Lou D. Complicated firms. AFA 2011 Denver Meetings Paper; 2010. SSRN 1570869.

4. Duffie D. Presidential address: asset price dynamics with slow-moving capital. *Journal of Finance*.2010;65(4):1237-1267.
5. Brailsford TJ. The empirical relationship between trading volume, returns and volatility. Research paper 94-01; 1994. Available:<http://www.trade2win.com/boards/attachments/day-trading-scalping/24067-see-now-voluvola.pdf> (19.03.2010, 15:44).
6. Barber BM, Odeau T. All That Glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *Review of Financial Studies*.2008;21(2):785-818.
7. Fama E, Shiller R, Hansen P. Scientific background. nobelprize.org, Stockholm; 2013
8. Choi H, Varian H. Predicting the present with google trends. Working paper, Available:www.google.com/googleblogs/pdfs/google_predicting_the_present.pdf (14.03.2010, 09:37). 2009.
9. RomerCD, Romer DH. A new measure of monetary shocks: Derivation and implications. *American Economic Review*. 2004;94(4):1055-1084.
10. Fleming MJ. Federal Reserve Liquidity Provision during the Financial Crisis of 2007-2009. *Annual Review of Financial Economics*. 2013;4(1):161-177.
11. Tetlock P. Giving content to investor sentiment: The role of media in the stock market. *Journal of Finance*. 2007;62(3):1139-1168.
12. McAndrews J, Sarkar A, Wang Z. The effect of the long-term auction facility of the london inter-bank offered rate. Federal Reserve Bank of New York Staff Report No. 335; 2008.
13. Christensen JHE, Lopez JA, Rudebusch GD. Do Central Bank liquidity facilities affect interbank interest rates? Federal Reserve Bank of San Francisco Working Paper 2009;13.
14. Sarkar A, ShraderJ. Financial amplification mechanisms and the federal reserve's supply of liquidity during the crisis. Federal Reserve Bank of New York Staff Report No. 431;2010.
15. Wu T. On the effectiveness of the federal reserve's new liquidity facilities. Federal Reserve Bank of Dallas. mimeo; 2008.
16. Mishkin F. Monetary policy strategy: Lessons from the Crisis. NBER Working paper series. No. 16755; 2011.

APPENDIX

Table 1A. 2004 to 2013

		Google Searches For...		
		EFSF	ESM	Basel III
News Dummy ¹⁾	EFSF	0.29	0.2	0.31
	ESM	0.17	0.42	0.17
	Basel III	0	0	0.35
1) Dummyvariables are 1 if any news announcement or 0 if nothing.				

Source: own calculations

Table 1B. 2010 to 2013

	ECB
ECB Rate	0.36
EFSF	0.27
ESM	0.16
Bank Bailout	0.43
EU Council	0.41

Source: own calculations

Table 2A. Profitability measures

Google	Non Interest Income Margin (%)	Non Interest Expense Margin (%)	Loan Loss Provision Margin (%)	Pretax Margin (%)	Net Margin (%)	Return on Assets (%)	Return on RWA (%)	Return on Equity (%)
Banco Bilbao Vizcaya Argentaria	-0.01	-0.29	-0.40	0.16	0.22	0.12	0.14	0.04
Banco do Barsil	-0.47	-0.52	-0.38	0.04	0.21	-0.45	0.59	-0.21
Banco Santander	0.03	0.45	-0.44	-0.36	-0.32	-0.33	0.22	-0.39
Bank of China	-0.36	0.67	-0.63	0.22	0.15	0.22	-0.53	-0.29
Bank of Communications	0.40	-0.40	0.40	-0.39	0.44	-0.08	0.45	-0.37
BNP Paribas			0.72	0.33	0.24	-0.48	-0.34	-0.47
Bank of America	-0.06	0.55	0.58	-0.88	-0.81	-0.83	-0.23	-0.85
China Construction Bank	-0.45	-0.38	0.68	-0.20	-0.20	-0.46	-0.45	-0.10
China Development Financial Group	-0.41	0.38		0.36	0.36	-0.20	0.38	-0.28
Commerzbank	-0.40	0.03	0.58	-0.16	-0.09	-0.11	-0.11	-0.14
CréditAgricole	-0.88	-0.92	0.79	-0.33	-0.34	-0.27	-0.18	-0.27
Danske Bank	-0.21	-0.02	-0.14	-0.71	-0.69	-0.70	-0.76	-0.74
Deutsche Bank	0.01	-0.49	0.60	-0.36	-0.23	-0.40	-0.31	-0.30
Goldman Sachs				-0.14	-0.15	0.16		0.30
HSBC	-0.63	0.60	-0.68	-0.72	-0.69	-0.15	-0.64	-0.64
Industrial Commercial Bank of China	-0.07	0.08	-0.11	-0.07	0.05	-0.10	-0.06	0.43
JP Morgan Chase	-0.04	-0.02	0.34	-0.47	-0.48	-0.35	-0.40	-0.35
Mitsubishi Financial Group	-0.38	-0.44		-0.33	-0.18	-0.25	-0.35	-0.26
Mizuho Financial Group	-0.17	-0.15		-0.39	-0.33	-0.22	0.20	-0.21
Nordea	-0.46	-0.31	0.49	0.06	0.05	-0.39	-0.18	-0.35
Norinchukin Bank				0.28	0.08	-0.01		-0.06
Royal Bank of Canada	0.56	0.09	-0.56	-0.53	-0.58	-0.08	0.67	0.33
SociétéGénérale				0.70	0.70	-0.69	-0.24	-0.63
Sumitomo Mitsui Financial Group	0.37	-0.39	-0.35	0.10	-0.07	-0.02	-0.38	0.00
The Bank of Nova Scotia	-0.58	-0.55	0.26	-0.38	-0.35	-0.57	-0.22	-0.45
The Toronto Bank	0.63	0.67	-0.80	-0.45	-0.67	-0.31	-0.64	0.43
UBS	0.03	0.43	0.49	-0.29	-0.29	-0.24	-0.35	-0.23
UniCredit	-0.62	0.59	0.41	-0.64	0.60	-0.85	-0.17	-0.86
Wells Frago	0.13	-0.05	-0.05	0.27	0.27	-0.22	-0.24	-0.41
Mean	-0.16	-0.02	0.08	-0.18	-0.11	-0.29	-0.15	-0.25
Median	-0.17	-0.02	0.26	-0.29	-0.15	-0.25	-0.23	-0.28
Varinace	0.15	0.21	0.27	0.14	0.16	0.08	0.14	0.12

Table 3A. Efficiency and liquidity measures

Google	Efficiency Ratio (%)	Total Asset Turnover (x)	Tier 1 Capital Adequacy Ratio (%)	Risk Weighted Assets	Total Capital Adequacy Ratio (%)	Loans/Deposits (%)
Banco Bilbao Vizcaya Argentaria	-0.25	-0.26	0.16	0.30	0.22	0.40
Banco do Barsil	-0.35	-0.81	-0.47	-0.60		0.63
Banco Santander	0.46	0.28	0.74	0.52	-0.28	0.56
Bank of China	0.67	0.04	0.47	-0.62	0.34	0.53
Bank of Communications	-0.40	-0.39	-0.20	0.23	0.01	0.47
BNP Paribas		-0.63	0.50	0.50	0.38	-0.71
Bank of America	0.61	-0.29	0.63	0.75	0.69	0.86
China Construction Bank	-0.38	-0.33	-0.23	-0.67	-0.54	0.20
China Development Financial Group	0.38	-0.26	0.40	-0.42	0.40	-0.44
Commerzbank	0.34	-0.38	0.68	0.47	0.66	0.62
CréditAgricole	-0.95	-0.85	0.71	0.24	0.43	-0.89
Danske Bank	0.01	-0.04	0.15	-0.27	0.15	0.64
Deutsche Bank	0.49	-0.49	-0.01	0.32	-0.05	0.56
Goldman Sachs		0.45				
HSBC	0.37	-0.61	0.50	-0.30	-0.19	0.51
Industrial Commercial Bank of China	0.11	0.15	-0.07	0.14	0.16	-0.11
JP Morgan Chase	0.03	0.16	-0.27	-0.18	-0.22	-0.12
Mitsubishi Financial Group	-0.44	-0.12	-0.33	-0.05	0.27	-0.42
Mizuho Financial Group	-0.11	0.48	-0.20	0.20	0.20	-0.24
Nordea	-0.12	-0.39	0.39	0.76	0.27	0.67
Norinchukin Bank		0.07	0.03			
Royal Bank of Canada	-0.08	0.69	-0.78	-0.67	-0.56	0.74
SociétéGénérale		0.73	0.38	0.81	0.78	-0.77
Sumitomo Mitsui Financial Group	-0.39	-0.02	-0.45	-0.32	-0.40	0.42
The Bank of Nova Scotia	-0.40	-0.45	-0.08	0.61	-0.01	-0.60
The Toronto Bank	0.60	0.59	-0.42	0.43	-0.63	0.84
UBS	0.23	0.52	-0.73	0.67	-0.62	0.17
UniCredit	0.78	-0.61	0.23	0.63	0.24	-0.71
Wells Frago	-0.09	-0.59	0.77	0.11	0.64	-0.43
Mean	0.04	-0.12	0.09	0.13	0.09	0.12
Median	0.01	-0.26	0.09	0.23	0.18	0.40
Varinace	0.19	0.21	0.21	0.23	0.17	0.32

Table 4A. Capital structure

Google	Financial Leverage (x)	Deposits/Assets (%)	LT Debt/Equity (x)	LT Debt/Total Capital (%)	Total Debt/Total Assets (%)	Net Debt/Total Equity (%)	Total Debt/Total Equity (%)	Total Debt/Total Capital (%)
Banco Bilbao Vizcaya Argentaria	-0.19	0.11	0.03	0.16	-0.11	-0.20	-0.19	-0.13
Banco do Barsil	0.47	-0.69	0.54	-0.47	0.84	0.75	0.81	0.77
Banco Santander	-0.50	0.50	0.07	0.50	-0.57	-0.73	-0.67	-0.41
Bank of China	-0.41	0.31	-0.36	0.27	-0.34	-0.30	-0.36	-0.34
Bank of Communications	0.37	-0.42	-0.15	-0.40	0.41	0.40	0.41	0.43
BNP Paribas	-0.14	-0.10	0.29	0.36	-0.44	-0.42	-0.41	-0.26
Bank of America	-0.63	-0.72	0.64	0.73	0.19	-0.34	-0.30	-0.27
China Construction Bank	0.46	0.22	-0.56	-0.47	-0.43	0.16	-0.29	-0.25
China Development Financial Group	0.33	0.38	0.01	-0.02	-0.06	0.27	0.14	0.18
Commerzbank	-0.71	0.73	-0.45	-0.09	-0.56	-0.71	-0.70	-0.71
CréditAgricole	0.63	-0.79	0.34	0.29	-0.27	0.31	0.27	0.30
Danske Bank	-0.45	0.03	-0.09	0.32	-0.67	-0.80	-0.80	-0.79
Deutsche Bank	0.61	-0.58	0.15	-0.07	-0.36			
Goldman Sachs	0.28	0.32	0.47	0.44	-0.11	0.22	0.26	0.23
HSBC	-0.28	0.22	0.26	-0.12	0.16	0.33	0.25	
Industrial Commercial Bank of China	0.26	-0.14	-0.14	-0.23	-0.16	-0.28	-0.47	
JP Morgan Chase	0.13	-0.28	0.24	0.12	0.28	0.22	0.21	0.23
Mitsubishi Financial Group	0.28	-0.38	0.33	-0.30	0.36	0.41	0.38	0.40
Mizuho Financial Group	0.17	0.28	0.06	0.34	-0.27	-0.15	-0.18	-0.14
Nordea	0.23	-0.28	-0.06	-0.03	-0.27	0.12	-0.23	0.00
Norinchukin Bank			0.31	0.31	0.39	0.51	0.29	0.17
Royal Bank of Canada	0.74	0.15	0.76	0.67	0.01	0.30	0.28	0.27
SociétéGénérale	-0.53	-0.08	-0.39	-0.14	-0.49	-0.55	-0.51	-0.62
Sumitomo Mitsui Financial Group	0.01	-0.08	0.01	-0.13	0.09	0.14	0.12	0.04
The Bank of Nova Scotia	0.31	-0.32	0.40	0.40	0.25	0.33	0.37	0.35
The Toronto Bank	0.72	-0.18	-0.19	-0.06	-0.57	-0.28	-0.24	-0.13
UBS	0.72	-0.11	0.25	-0.63	0.52	0.62	0.62	0.72
UniCredit	-0.27	-0.09	-0.08	-0.04	0.08	0.33	0.02	-0.25
Wells Frago	-0.72	0.63	-0.70	-0.52	-0.72	-0.64	-0.68	-0.83
Mean	0.07	-0.05	0.07	0.04	-0.10	0.00	-0.06	-0.04
Median	0.20	-0.09	0.06	-0.03	-0.11	0.15	-0.08	-0.06
Varinace	0.22	0.16	0.13	0.13	0.16	0.19	0.19	0.19

Google	Return on Total Capital (%)	Return on Invested Capital (%)	Cash Flow Return on Invested Capital (%)	Basic DuPont ROE (%) (3 Step)	Net Margin (%)	Asset Turnover	Equity Multiplier
Banco Bilbao Vizcaya Argentaria	0.16	-0.04		0.04	0.22	-0.28	-0.21
Banco do Brasil	-0.82	-0.13	-0.65	-0.21	0.21	-0.78	0.34
Banco Santander	-0.09	-0.51	0.78	-0.39	-0.32	0.11	-0.57
Bank of China	0.19	-0.35	-0.22	-0.29	0.15	-0.12	-0.49
Bank of Communications	-0.45	-0.37	0.39	-0.37	0.44	-0.38	-0.39
BNP Paribas	-0.14	-0.46		0.45	0.24	-0.63	0.07
Bank of America	-0.87	-0.87	-0.10	-0.85	-0.81	-0.45	-0.82
China Construction Bank	-0.15	0.31	-0.14	-0.10	-0.20	-0.23	0.51
China Development Financial Group	-0.26	-0.26	-0.45	0.12	0.36	0.25	0.40
Commerzbank	-0.08	-0.08	0.03	-0.14	-0.09	-0.53	-0.73
CréditAgricole	-0.23	-0.29		-0.27	-0.34	-0.37	0.53
Danske Bank	-0.63	-0.15	0.55	-0.78	-0.69	-0.22	-0.34
Deutsche Bank	-0.33	-0.29	-0.33	-0.30	-0.23	-0.43	0.65
Goldman Sachs	0.16	0.10	-0.12	0.30	-0.15	0.40	0.32
HSBC	-0.61	0.48	-0.64	-0.72	0.33	0.64	-0.63
Industrial Commercial Bank of China	0.14	-0.24	-0.06	-0.07	0.08	-0.11	-0.05
JP Morgan Chase	-0.33	-0.34	0.03	-0.35	-0.48	0.13	0.04
Mitsubishi Financial Group	-0.38	-0.31	-0.48	-0.26	-0.18	-0.13	0.11
Mizuho Financial Group	-0.11	-0.20	-0.11	-0.21	-0.33	0.47	0.05
Nordea	-0.15	-0.09	-0.30	-0.35	0.05	-0.36	0.35
Norinchukin Bank	-0.13	-0.12	-0.15	-0.06	0.08	0.07	-0.31
Royal Bank of Canada	0.11	0.04	-0.35	0.33	-0.58	0.69	0.71
SociétéGénérale	-0.54	-0.47		-0.71	0.70	0.73	-0.15
Sumitomo Mitsui Financial Group	0.06	0.02	-0.38	0.00	-0.07	0.01	0.07
The Bank of Nova Scotia	-0.44	-0.45	0.02	-0.45	-0.35	-0.42	0.32
The Toronto Bank	0.39	0.47	-0.28	0.43	-0.67	0.59	0.77
UBS	-0.30	-0.21	-0.21	-0.23	-0.29	0.49	0.76
UniCredit	-0.82	-0.85		-0.62	0.60	-0.61	-0.51
Wells Fargo	0.12	0.04	0.30	-0.41	0.27	-0.62	-0.73
Mean	-0.23	-0.19	-0.12	-0.22	-0.07	-0.07	0.00
Median	-0.15	-0.21	-0.14	-0.26	-0.09	-0.13	0.05
Varinace	0.11	0.10	0.12	0.12	0.15	0.20	0.24

Table 5A. Quarterly Time-Series Correlation, 2004 to 2013

Google to Google	-4Q	-3Q	-2Q	-1Q	0Q	+1Q	+2Q	+3Q	+4Q
Banco Bilbao Vizcaya Argentaria	0.18	0.06	0.30	0.03	1.00	0.03	0.30	0.06	0.18
Banco do Barsil	0.78	0.80	0.79	0.82	1.00	0.82	0.79	0.80	0.78
Banco Santander	0.66	0.68	0.75	0.75	1.00	0.75	0.75	0.68	0.66
Bank of China	0.48	0.42	0.44	0.53	1.00	0.53	0.44	0.42	0.48
Bank of Communications	0.00	0.22	-0.01	0.18	1.00	0.18	-0.01	0.22	0.00
BNP Paribas	0.53	0.58	0.73	0.80	1.00	0.80	0.73	0.58	0.53
Bank of America	0.83	0.84	0.88	0.90	1.00	0.90	0.88	0.84	0.83
China Construction Bank	0.29	0.41	0.47	0.60	1.00	0.60	0.47	0.41	0.29
China Development Financial Group	0.37	0.22	0.18	0.34	1.00	0.34	0.18	0.22	0.37
Citi Group	0.52	0.52	0.55	0.59	1.00	0.59	0.55	0.52	0.52
Commerzbank	0.56	0.66	0.76	0.82	1.00	0.82	0.76	0.66	0.56
Crédit Agricole	0.89	0.91	0.93	0.95	1.00	0.95	0.93	0.91	0.89
Danske Bank	0.84	0.85	0.85	0.92	1.00	0.92	0.85	0.85	0.84
Deutsche Bank	0.50	0.57	0.61	0.64	1.00	0.64	0.61	0.57	0.50
Goldman Sachs	0.23	0.31	0.28	0.40	1.00	0.40	0.28	0.31	0.23
HSBC	0.34	0.46	0.64	0.83	1.00	0.83	0.64	0.46	0.34
Industrial Commercial Bank of China	0.01	0.03	-0.14	-0.03	1.00	-0.03	-0.14	0.03	0.01
JP Morgan Chase	0.27	0.12	0.19	0.22	1.00	0.22	0.19	0.12	0.27
Mitsubishi Financial Group	0.23	0.13	0.39	0.09	1.00	0.09	0.39	0.13	0.23
Mizuho Financial Group	0.20	0.27	0.36	0.38	1.00	0.38	0.36	0.27	0.20
Nordea	0.61	0.62	0.69	0.73	1.00	0.73	0.69	0.62	0.61
Norinchukin Bank	0.33	0.34	0.33	0.43	1.00	0.43	0.33	0.34	0.33
Royal Bank of Canada	0.83	0.80	0.82	0.82	1.00	0.82	0.82	0.80	0.83
Société Générale	0.73	0.83	0.88	0.92	1.00	0.92	0.88	0.83	0.73
Sumitomo Mitsui Financial Group	0.17	0.11	0.18	0.40	1.00	0.40	0.18	0.11	0.17
The Bank of Nova Scotia	0.39	0.47	0.55	0.54	1.00	0.54	0.55	0.47	0.39
The Toronto Bank	0.82	0.79	0.80	0.80	1.00	0.80	0.80	0.79	0.82
UBS	0.50	0.54	0.63	0.62	1.00	0.62	0.63	0.54	0.50
UniCredit	0.78	0.80	0.84	0.84	1.00	0.84	0.84	0.80	0.78
Wells Frago	0.85	0.90	0.95	0.97	1.00	0.97	0.95	0.90	0.85
Mean	0.49	0.51	0.56	0.59	1.00	0.59	0.56	0.51	0.49
Median	0.50	0.53	0.62	0.63	1.00	0.63	0.62	0.53	0.50
Varinace	0.07	0.08	0.09	0.08	0.00	0.08	0.09	0.08	0.07

Table 6A. Estimation of eq. 3 – model I

Variable	Banco Bilbao Vizcaya Argentaria	Banco do Barsil	Banco Santander	Bank of Communi-cations	BNP Paribas	Bank of America	China Construction Bank	China Development Financial Group	Citi Group	Commerz Bank	Crédit Agricole	Danske Bank	Deutsche Bank	Goldman Sachs
Constant	15.63653*** (0.5297)	42.15531*** (0.3246)	38.40386*** (1.4403)	32.58651*** (0.5872)	45.27929*** (0.7992)	79.50465** * (0.6842)	41.63714*** (0.2555)	21.5124*** (0.8043)	22.2888*** (0.6464)	55.81159*** (0.5130)	83.96654*** (0.6907)	64.15744*** (1.1479)	69.25755** * (0.4801)	17.57442* ** (0.3392)
Dvidend Payout	0.019104*** (0.0071)	-0.006237*** (0.0005)	-0.000502* (0.0002)	-0.047032*** (0.0051)	0.00524*** (0.0015)	0.000118** * (0.0000)	-0.005125*** (0.0013)	-0.000794*** (0.0002)	0.011898*** (0.0004)	- (0.0001)	- (0.0000)	0.007785** (0.0037)	0.004411** * (0.0002)	0.016988* ** (0.0047)
DPS	-0.755444 (0.6506)	0.414988*** (0.0121)	1.938159*** (0.1229)	5.578517*** (0.4117)	0.040101 (0.0351)	0.163928** * (0.0307)	2.990722*** (0.1844)	0.91691*** (0.1160)	- (0.0100)	-0.002109 (0.0159)	0.005371 (0.0470)	- (0.0162169*** (0.03557)	- (0.0179)	0.570534* ** (0.0268)
Price/Book Value	1.377247 (1.1601)	-1.090058*** (0.0456)	- 0.102243*** (0.0030)	17.1574*** (2.9448)	0.193046*** (0.0551)	0.539099** * (0.0525)	5.012027*** (0.6250)	60.51416*** (15.8290)	4.026587*** (0.1665)	- (1.5350)	-0.211703 (0.0004)	3.460194*** (0.7708)	8.150496** * (0.3823)	- ** (0.1369)
Price/Earnings	0.007805 (0.0443)	0.036701*** (0.0005)	0.01761 (0.0739)	-0.381267*** (0.0684)	0.063513*** (0.0046)	0.000235 (0.0001)	-0.176137*** (0.0408)	-0.000934*** (0.0002)	0.006256*** (0.0011)	0.000545*** (0.0000)	0.000651* (0.1118)	0.004309 (0.0028)	- 0.006352** * (0.0007)	0.028077* ** (0.0066)
Price/Tabible Book Value	-0.756371 (0.7268)	1.154413*** (0.0429)	-0.035376 (0.0397)	-14.39298*** (2.9517)	-0.002571 (0.0253)	- 0.056209** (0.0261)	-3.789293*** (0.4937)	-59.58517*** (15.8595)	- 1.915109*** (0.0995)	17.01082*** (1.3990)	0.507113*** (0.0543)	- 1.837846*** (0.6650)	- 5.347579** * (0.2555)	0.791922* ** (0.0997)
Price/Cash Flow	-	0.00000653** * (0.0000)	0.015764*** (0.0018)	0.015708*** (0.0016)	-	0.000371** (0.0001)	-0.0000162 (0.0000)	0.0000894*** (0.0000)	- 0.002917*** (0.0007)	0.020919** (0.0089)	-	- 0.00000706 *** (0.000)	- 0.012403** * (0.0016)	-0.002553 (0.0024)
SP_BBILBAO	0.305623*** (0.0579)	-0.077001*** (0.0125)	- 1.008338*** (0.1366)	0.283561*** (0.0813)	- 0.060354*** (0.0114)	- 0.422185** (0.0173)	0.126392*** (0.0155)	-1.20342*** (0.07267)	0.01696*** (0.0016)	- 0.019928*** (0.0045)	-0.711273*** (0.0298)	- 0.174948*** (0.0072)	-0.007091 (0.0063)	0.029315* ** (0.0023)
VOL_BBILBAO	-0.00000224 (0.0000)	0.0000384* (0.0000)	-0.0000026 (0.0000)	0.00000245 (0.0000)	- 0.000191*** (0.0000)	0.0000017 4 (0.0000)	-0.0000028 (0.0000)	0.00000159 (0.0000)	- 0.0000426* ** (0.0000)	0.00105*** (0.0010)	-0.0000547** (0.0000)	-0.000396 (0.0002)	0.0000846 *** (0.0000)	- 0.0000308 *** (0.0000)
R-squared	0.858139	0.996871	0.960448	0.935248	0.940387	0.926225	0.959022	0.925987	0.858837	0.916505	0.972719	0.892268	0.89946	0.987452
Adjusted R-squared	0.854349	0.996815	0.959771	0.933125	0.939505	0.92498	0.957781	0.924632	0.856454	0.915077	0.972315	0.890331	0.897741	0.98724
S.E. of regression	2.104818	1.050957	5.491734	2.247156	3.64447	4.494727	1.742197	3.31989	4.59113	4.396298	3.4004	5.902433	2.607639	1.528434
F-statistic	226.4118	17604.96	1417.546	440.53	1065.932	743.8684	772.3171	683.4237	360.4762	642.1366	2409.28	460.7022	523.3586	4662.57
Prob(F-statistic)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Durbin-Watson stat	0.356271	0.228452	0.196253	0.559128	0.238361	0.282471	0.401544	0.191453	0.420921	0.619066	0.784484	0.301295	1.128895	0.361044

Mitsubishi Financial Group	Mizuho Financial Group	Nordea	Norinch ukin Bank	Royal Bank of Canada	Société Générale	Sumitom o Mitsui Financial Group	The Bank of Nova Scotia	The Toronto Bank	UBS	UniCredit	Wells Frago
17.00818*** (0.8533)	24.29013*** (0.4737)	56.9699*** (0.7525)	25.96034*** (0.4230)	70.71852*** (1.4205)	66.93392*** (0.9360)	25.18311* ** (0.2194)	53.14167*** (2.9390)	25.49133*** (1.1269)	53.98142*** (0.3387)	71.46446*** (1.7786)	42.50741*** (2.0094)
0.002524* (0.0015)	-0.001608*** (0.0002)	0.01405*** (0.0009)	0.004598*** (0.0010)	-0.019135*** (0.0029)	-0.000169*** (0.0000)	0.002467* ** (0.0002)	- 0.052917*** (0.0075)	0.031626*** (0.0024)	- 0.053734*** (0.0077)	-0.007199*** (0.0011)	-0.017409*** (0.0012)
0.011982 (0.0074)	0.077232*** (0.0044)	-1.07461*** (0.3831)	9.888409*** (0.6022)	-20.47612*** (0.7460)	0.179214*** (0.0114)	0.004007* ** (0.0001)	0.366948** (0.1839)	-0.057116** (0.0227)	-0.082874 (0.1804)	0.366672*** (0.0404)	0.733276*** (0.0775)
1.544063*** (0.3964)	-3.386006*** (0.4062)	0.251374 (0.5294)	0.047276*** (0.0045)	-0.540165*** (0.1785)	2.410737*** (0.0859)	- 2.10634*** (0.1112)	0.423365*** (0.0412)	0.312053*** (0.0363)	2.938804*** (0.0958)	1.632543*** (0.0926)	0.332214*** (0.0523)
-0.001102* (0.0006)	0.008372*** (0.0006)	0.005795 (0.0067)	0.002618*** (0.0026)	0.066419*** (0.0138)	0.001766*** (0.0002)	- 0.000855* ** (0.0000)	0.193699 (0.2161)	-0.060293*** (0.0084)	0.020772*** (0.0017)	0.002327* (0.0012)	0.045933*** (0.0053)
-1.707872*** (0.3702)	3.381641*** (0.4094)	0.037515 (0.4350)	- (0.0003)	0.611015*** (0.1451)	-1.628156*** (0.0591)	2.424026* ** (0.1106)	- 1.033822*** (0.2787)	-0.002222 (0.0112)	- 1.385171*** (0.0617)	-0.603086*** (0.0726)	-0.027276*** (0.0084)
0.809146*** (0.1065)	0.009305*** (0.0010)	0.001299* (0.0006)	- 0.005565*** (0.0003)	-0.002125*** (0.0003)	- (0.0000)	0.001147* ** (0.0002)	- 0.004157*** (0.0006)	-0.000439*** (0.0000)	0.001014*** (0.0001)	- (0.0000)	0.00054 (0.0003)
-0.005406*** (0.0006)	-0.001198* (0.0006)	-0.028429* (0.0156)	0.058879 (0.0370)	0.388514*** (0.0344)	-0.016269 (0.0107)	0.0000455 ** (0.0000)	- 0.690693*** (0.0587)	0.070145*** (0.0178)	0.060639*** (0.0093)	-0.870415*** (0.0594)	0.033022 (0.6386)
0.0000419*** (0.0000)	0.00000589* ** (0.000)	0.0000318*** (0.0000)	-0.00011 (0.0000)	0.000161** (0.0000)	-0.000405*** (0.0000)	0.0000656 *** (0.0000)	0.001046*** (0.0002)	-0.000163** (0.0000)	0.00000083 2** (0.0000)	-0.0000487*** (0.0000)	- (0.0000)
0.940781	0.957721	0.982258	0.919638	0.92527	0.919874	0.994375	0.869463	0.979247	0.916624	0.90018	0.948399
0.939585	0.956863	0.981945	0.918263	0.924001	0.918686	0.994262	0.867241	0.978895	0.915178	0.898681	0.947528
4.099444	3.231461	2.10955	3.820875	3.89602	5.607915	1.100167	6.953067	2.575227	3.13815	9.901318	4.501071
786.3838	1115.639	3141.793	668.6399	728.9601	774.1066	8816.352	391.3125	2778.064	633.5247	600.3436	1088.975
0	0	0	0	0	0	0	0	0	0	0	0
0.576813	0.456271	0.525038	0.260794	0.234234	0.231045	0.381407	0.360616	0.192226	0.554213	1.037916	0.196744

Table 7A. Estimation of eq. 4 – model II

Variable	Banco Bilbao Vizcaya Argentaria	Banco do Barsil	Banco Santander	Bank of Communi-cations	BNP Paribas	Bank of America	China Construction Bank	China Development Financial Group	Citi Group	Commerz Bank	Crédit Agricole	Danske Bank	Deutsche Bank	Goldman Sachs
Constant	12.9244*** (0.6594)	40.67986*** (0.3960)	30.39629*** (1.6341)	31.9746*** (1.0430)	28.35165*** (1.3048)	34.01562*** (2.4420)	38.31753*** (0.9814)	16.96057*** (0.9305)	15.02368*** (0.8390)	35.55535*** (1.6336)	65.9577*** (2.9752)	30.63254*** (1.7165)	59.7962*** (1.5782)	17.57135*** (0.3491)
Dvidend Payout	0.012203* (0.0073)	- 0.005519*** (0.0004)	-0.000464* (0.0002)	-0.047138*** (0.0051)	0.003334*** (0.0012)	0.0000923*** (0.0000)	-0.003702*** (0.0013)	-0.000554** (0.0000)	0.009204*** (0.0004)	-0.000342** (0.0001)	- 0.0000461*** (0.0000)	0.00427* (0.0023)	0.003923*** (0.0002)	0.017048*** (0.0049)
DPS	-0.322451 (0.6460)	0.389737*** (0.0120)	1.839721*** (0.1154)	5.573166*** (0.4130)	0.046959 (0.0291)	0.060641** (0.0242)	2.599684*** (0.2094)	0.598206*** (0.1144)	- 0.077629*** (0.0094)	0.021739 (0.0138)	0.043124 (0.0459)	-0.087027*** (0.0225)	-0.02544 (0.0174)	0.567954*** (0.0277)
Price/Book Value	0.74194 (1.1384)	- 1.051546*** (0.0436)	- 0.186914*** (0.0002)	16.80956*** (2.9872)	0.051466 (0.0466)	0.205176*** (0.0434)	4.489831*** (0.6183)	41.27519*** (15.0124)	3.019026*** (0.1683)	- 13.90863*** (1.3522)	-0.079909 (0.1098)	1.070087** (0.4968)	7.181688*** (0.3968)	- 0.718309*** (0.1379)
Price/Earnings	0.036568 (0.0470)	0.03037*** (0.0050)	0.015252** (0.07357)	-0.375872*** (0.0702)	0.049312*** (0.0039)	0.000017 (0.0003)	-0.163474*** (0.0394)	-0.000408 (0.0002)	0.004449*** (0.0009)	0.000407*** (0.0000)	0.00049 (0.0004)	0.005201*** (0.0017)	- 0.005137*** (0.0007)	- 0.02802*** (0.0006)
Price/Tabile Book Value	-0.416036 (0.6968)	1.130177*** (0.0409)	-0.000778 (0.0450)	-14.07576*** (2.9891)	-0.009529 (0.0222)	0.00008 (0.0001)	-3.344201*** (0.4903)	-40.38078* (15.0398)	- 1.456781*** (0.0944)	13.30994*** (1.2370)	0.352986*** (0.0594)	-0.385426 (0.4236)	- 4.71382*** (0.2643)	- 0.786341*** (0.1006)
Price/Cash Flow	-	0.0000064*** (0.0000)	0.013967*** (0.0017)	0.015633*** (0.0016)	-	0.000258* (0.0001)	-0.0000151 (0.0000)	0.0000547*** (0.0000)	- 0.002729*** (0.0006)	0.00429 (0.0078)	-	- 0.00000649*** (0.0000)	- 0.011499*** (0.0015)	-0.002677 (0.0025)
SP_BBILBAO	0.191334*** (0.0628)	- 0.090311*** (0.0119)	- 0.682042*** (0.1337)	0.279444*** (0.0817)	- 0.035004*** (0.1167)	- 0.164081*** (0.01886)	0.111167*** (0.01536)	-0.916474*** (0.0764)	0.012666*** (0.0014)	-0.003362 (0.0041)	- 0.540591*** (0.0000)	-0.083235*** (0.0062)	-0.00562 (0.0060)	0.029534*** (0.0002)
VOL_BBILBAO	- 0.000000961 (0.6179)	0.0000286 (0.0000)	- 0.00000404 (0.0000)	0.0000025 (0.0000)	-0.0000764 (0.0000)	0.00000213 (0.0000)	0.000000653 (0.0000)	0.00000308 (0.0000)	- 0.0000186** (0.0000)	0.000653*** (0.0000)	-0.0000359 (0.0000)	-0.000167 (0.0001)	0.0000573* (0.0000)	- 0.000029*** (0.0000)
Google (-1)	0.118375*** (0.0284)	0.022702*** (0.0085)	0.095949*** (0.0209)	0.014349 (0.0202)	0.33546*** (0.0333)	0.311797*** (0.0360)	0.039086* (0.0200)	0.121018*** (0.1210)	0.200731*** (0.0305)	0.232704*** (0.0322)	0.311116*** (0.0359)	0.400925*** (0.0369)	0.148663*** (0.0233)	0.007698 (0.0087)
Google (-2)	0.079427*** (0.0260)	0.022668*** (0.0072)	0.064661*** (0.0182)	0.002951 (0.0180)	0.025839 (0.0289)	0.253011*** (0.0353)	0.037893* (0.0196)	0.048496** (0.0196)	0.103853*** (0.0267)	0.121201*** (0.0293)	- 0.102952*** (0.0326)	0.127722*** (0.0329)	-0.010133 (0.0217)	-0.009858 (0.0079)
R-squared	0.871185	0.997214	0.966768	0.935409	0.959671	0.957655	0.96235	0.93652	0.895423	0.939002	0.976267	0.957779	0.909374	0.987368
Adjusted R-squared	0.866691	0.99715	0.96605	0.93274	0.958897	0.956754	0.960902	0.935054	0.893198	0.937688	0.975811	0.956822	0.907421	0.987099
S.E. of regression	1.962608	0.993248	5.046198	2.253615	2.993816	3.389836	1.67865	3.084798	3.967095	3.772753	3.159156	3.700253	2.486329	1.532006
F-statistic	193.8739	15678.15	1346.915	350.4671	1240.043	1062.926	664.572	638.8051	402.4314	714.2829	2143.575	1000.415	465.5969	3673.606
Prob(F-statistic)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Durbin-Watson stat	0.60471	0.243086	0.479453	0.591312	0.864928	1.390291	0.429273	0.408921	0.83666	1.180945	1.305716	1.149393	1.327337	0.372707

Variable	Mitsubishi Financial Group	Mizuho Financial Group	Nordea	Norinchukin Bank	Royal Bank of Canada	Société Générale	Sumitomo Mitsui Financial Group	The Bank of Nova Scotia	The Toronto Bank	UBS	UniCredit	Wells Frago
Constant	14.05723*** (0.9050)	22.21141*** (0.5286)	52.94546*** (0.9323)	18.61247*** (0.6655)	41.79342*** (2.8560)	26.67833*** (1.8771)	24.76948*** (0.2720)	41.78041*** (2.2594)	16.46787*** (1.2378)	43.652*** (1.4299)	46.78698*** (3.2981)	11.08749*** (1.4224)
Dvidend Payout	0.00179 (0.0014)	-0.001432*** (0.0002)	0.013599*** (0.0008)	0.006458*** (0.0008)	-0.021139*** (0.0026)	-0.00011*** (0.0000)	0.002368*** (0.0002)	-0.034607*** (0.0057)	0.028237*** (0.0024)	-0.044155*** (0.0074)	-0.005363*** (0.0011)	-0.004167*** (0.0007)
DPS	0.014673** (0.0070)	0.071409*** (0.0043)	-1.085791*** (0.3662)	7.975058*** (0.5437)	-11.81855*** (0.9861)	0.079579*** (0.0091)	0.004014*** (0.0001)	0.33841*** (0.1368)	-0.052959*** (0.0201)	-0.024235 (0.1723)	0.288558*** (0.0384)	0.161008*** (0.0448)
Price/Book Value	1.402955*** (0.3775)	-3.241023*** (0.3839)	-0.031217*** (0.5061)	0.043636*** (0.0039)	-0.510809*** (0.1629)	0.962253*** (0.0867)	-2.025376*** (0.1159)	-0.046649 (0.1611)	0.287072*** (0.0320)	2.454799*** (0.1117)	1.020003*** (0.1142)	0.095973*** (0.0306)
Price/Earnings	-0.000983 (0.0006)	0.007195*** (0.0006)	0.006285 (0.0064)	0.001274*** (0.0004)	0.061514*** (0.0121)	0.000893*** (0.0001)	-0.000863*** (0.0000)	0.3083*** (0.0311)	-0.055716*** (0.0078)	0.017494*** (0.0017)	0.001769 (0.0011)	0.012952*** (0.0030)
Price/Tabile Book Value	-1.441683*** (0.3537)	3.254205*** (0.3873)	0.248456 (0.4160)	-	0.608252*** (0.1338)	-0.648602*** (0.0593)	2.346032*** (0.1141)	-0.696299*** (0.2078)	0.006731 (0.0100)	-1.157201*** (0.0659)	-0.336276*** (0.0758)	-0.009526* (0.0054)
Price/Cash Flow	0.608548*** (0.1052)	0.008217*** (0.0010)	0.000377 (0.0006)	-0.004728*** (0.0002)	-0.002617*** (0.0004)	-	0.001213*** (0.0002)	0.0000148 (0.0005)	-0.000412*** (0.0000)	0.000844*** (0.0001)	-	0.0000313 (0.0001)
SP_BBILBAO	-0.003394*** (0.0006)	-0.001875*** (0.0006)	-0.031084*** (0.0148)	0.141307*** (0.0318)	0.311702*** (0.0308)	-0.000908 (0.0074)	0.0000392** (0.0000)	-0.595236*** (0.0439)	0.12967*** (0.01644)	0.051532*** (0.0106)	-0.516465*** (0.0685)	0.001024 (0.0343)
VOL_BBILBAO	0.0000307*** (0.0000)	0.000005*** (0.0000)	0.0000322*** (0.0000)	-0.000191*** (0.0000)	0.000144** (0.0000)	-0.000173*** (0.0000)	0.0000653*** (0.0000)	0.000454*** (0.0001)	0.0000427 (0.0000)	0.000033** (0.0000)	-0.0000289* (0.0000)	-0.0000107*** (0.0000)
Google (-1)	0.095486*** (0.0198)	0.049872*** (0.01434)	0.061884*** (0.0132)	0.144774*** (0.01942)	0.166109*** (0.0256)	0.580959*** (0.0378)	0.009223 (0.0057)	0.19738*** (0.0191)	0.0803*** (0.0119)	0.13307*** (0.0254)	0.212916*** (0.0375)	0.367728*** (0.0362)
Google (-2)	0.047171** (0.0180)	0.053459*** (0.0134)	0.017924 (0.0123)	0.102718*** (0.1027)	0.156692*** (0.1566)	0.015055 (0.0378)	0.007657 (0.0054)	0.172931*** (0.0189)	0.07261*** (0.0117)	0.048358** (0.0235)	0.117872*** (0.0364)	0.383476*** (0.0368)
R-squared	0.947682	0.962505	0.984046	0.942715	0.942064	0.96222	0.99443	0.928357	0.983997	0.926419	0.914705	0.985476
Adjusted R-squared	0.946348	0.961544	0.983691	0.941442	0.940823	0.961494	0.994289	0.926819	0.983654	0.924809	0.913044	0.985167
S.E. of regression	3.866462	3.040524	2.001843	3.209418	3.407982	3.84204	1.094572	5.159799	2.256308	2.960119	9.162514	2.393374
F-statistic	710.0685	1001.148	2775.606	740.5427	759.3551	1324.394	7069.878	603.8446	2871.438	575.381	550.5017	3189.019
Prob(F-statistic)	0	0	0	0	0	0	0	0	0	0	0	0
Durbin-Watson stat	0.734132	0.545461	0.588244	0.519974	0.81269	1.457.647	0.433998	0.662563	0.246227	0.857923	1.662.417	1.621698

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